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Detecting *Chlamydia trachomatis* by direct immunofluorescence using a Cytobrush sampling technique

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SUMMARY We compared two different methods of collecting endocervical samples for examination by direct immunofluorescence for *Chlamydia trachomatis*. A cervical Cytobrush gave better results than a dacron swab. Further studies should be performed to assess the value of alternative sampling methods to detect this organism.

Chlamydiae are now commonly detected in genital tract specimens in routine diagnosis by direct immunofluorescence. Direct immunofluorescence is as sensitive and specific as conventional culture.[1] Studies in our laboratory also suggest that direct immunofluorescence may be a valuable test for cure.[2]

One of the problems encountered with direct immunofluorescence, as with culture, is the need for proper specimen collection and the ability to obtain endocervical cells for analysis.[3] Phillips and colleagues found that the number of cells present on the slide affected the direct immunofluorescence test results, and improved sensitivity was found when more endocervical cells were present.[4] A swab is generally used to collect cervical material for analysis with direct immunofluorescence. Another device, the cervical Cytobrush (International Cytobrush, Hollywood, Florida, USA), has been used successfully at this school of medicine for performing Papanicolau smears and has also been found by Ros *et al* to be superior to swab collection of endocervical cells for cytopathological analysis.[5] Because of its abrasive surface, the Cytobrush might also be better at disrupting the infected cells present in cervical secretions and thus improve chlamydial detection. As part of studies of chlamydial infections in our family planning clinic,[2] we studied the use of the Cytobrush as a collection device for diagnosing chlamydial infection, and we compared it with swab collection.

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Patients and methods

We studied women aged 15 to 19 who attended the family planning clinic of the hospital of the University of Pennsylvania for routine gynaecological examination. In the first phase of the study, samples for chlamydial detection were collected using the MicroTrak collection device (MicroTrak, Syva Company, Palo Alto, California). This collection kit contains a glass slide for smear preparation, a dacron swab for sample collection, and fixative. In the second phase of the study, a Cytobrush (International Cytobrush, catalogue No 166100) was substituted for the dacron swab. The Cytobrush has a plastic shaft with nylon bristles arranged in a spiral at one end. In both phases, we collected endocervical cells in an identical fashion.

Statistical analysis of data was performed using Yate's corrected χ^2 analysis.

Results

In phase one of this study, of 103 consecutive samples taken using the MicroTrak swab as the collection device, 73 (71%) contained sufficient endocervical material for analysis. In phase two 88 (63%) of 139 patients sampled with the Cytobrush yielded adequate samples for analysis. The difference between the sampling efficiency of each group was not significant ($\chi^2c = 1{\cdot}197$; $p < 0{\cdot}3$).

The table summarises the results of direct immunofluorescent of the adequate samples from both phases of the study. In phase one the percentage of positive samples was 12% compared with 27% in

Table *Detection of Chlamydia trachomatis in 161 endocervical samples using two different collection devices*

Method of collection	Direct immunofluorescence result		
	Positive	Negative	Total
MicroTrak swab	9	64	73
Cytobrush	24	64	88
Total	33	128	161

phase two. The difference in detection in the two phases was significant ($\chi^2c = 4{\cdot}61$; $p < 0{\cdot}05$).

Discussion

We found that the use of the Cytobrush more than doubled the detection of chlamydiae. This increase, however, did not appear to be caused by an overall improvement in sample adequacy, as the proportions of negative results in both phases of the study were similar (88% in phase one, 73% in phase two). Sampling with the brush was possibly better, though we did not count the number of endocervical cells present on the slides to make this comparison. The Cytobrush is more abrasive than a dacron swab and may have caused greater disruption of infected cells, thus improving positivity.

Although this was not a randomised study and the number of patients studied was relatively small, we do not believe that the different positivity in the two phases can be attributed to differences in the population or to a spontaneous increase in chlamydial infection. Both groups of patients were of the same socioeconomic class and age as those routinely seen for gynaecological examination. During the same period as the study, the overall clinic incidence of gonococcal infection was similar (4% in both phases). In addition, the incidence of gonococcal infection was similar (6%) in each group of patients.

Although the brush appeared to improve chlamydial detection, we did encounter problems with its use. In general, we rejected more samples obtained with the Cytobrush than with the swab because of the presence of gross blood. In addition, cervical bleeding was more a problem with the brush than with the swab device. On occasion, however, positive samples may be detected in the presence of gross blood. Under this circumstance, the results should be reported as being positive and are acceptable for evaluation.

Our findings suggest that additional randomised studies should be performed to assess the usefulness of the Cytobrush in improving the diagnosis of chlamydial infection.

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